Amendment under 37 CFR § 1.116
Application No. 10/519,802
Attorney Docket No. 043061

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions of claims in the application.

1. (Currently amended) A metal-based resistance heat-generation element excellent in heat resistance and high-temperature corrosion resistance, comprising:

a heat-generation element member made of a platinum-group metal or refractory metal; and

a coating film formed on all surfaces of said heat-generation element member, said coating film including:

a first layer [[of]] including a Re-Cr based σ (sigma) phase formed by heat treatment of a film made of a Re-Cr alloy or a bilayer film consisting of a Re layer and a Cr layer, and

a second layer of an aluminide or silicide, wherein said first layer being disposed closer to said heat-generation element member than said second layer.

2. (Currently amended) A metal-based resistance heat-generation element excellent in heat resistance and high-temperature corrosion resistance, comprising:

a heat-generation element member made of an alloy containing a platinum-group metal or refractory metal, and Re and Cr diffused therein, a peripheral portion having higher Re

concentration than a central portion in a cross section of said heat-generation element member; and

a coating film formed on all surfaces of said heat-generation element member, said coating including an aluminide or silicide layer.

3. (Previously presented) A method for producing a metal-based resistance heat-generation element excellent in heat resistance and high-temperature corrosion resistance, comprising the steps of:

forming a material made of a platinum-group metal or refractory metal into a shape of a heat-generation element member;

forming on all surfaces of said heat-generation element member a film made of a Re-Cr alloy or a bilayer film consisting of a Re layer and a Cr layer, thereby obtaining a film-coated member;

heat treating said film-coated member so as to convert said film to an inner layer of a Re-Cr based σ (sigma) phase, thereby obtaining a heat-treated member; and

subjecting said heat-treated member to an aluminum or silicon diffusion coating so as to form an aluminide or silicide layer on all surfaces of said inner layer.

4. (Original) The method as defined in claim 3, which includes the step of forming a Cr film and an Al film on said inner layer of the Re-Cr based σ (sigma) phase, wherein the step of

subjecting the heat-treated member to an aluminum or silicon diffusion coating includes subjecting said member with said Cr and Al films to an aluminum diffusion coating at a given high temperature to allow said Cr and Al films to be formed as a Cr-aluminide layer.

5. (Original) The method as defined in claim 3, which includes the step of forming a Re film and an Al film on said inner layer of the Re-Cr based σ (sigma) phase, wherein the step of subjecting the heat-treated member to an aluminum or silicon diffusion coating includes subjecting said member with said Re and Al films to an aluminum diffusion coating at a given high temperature to allow said Re and Al films to be formed as a Re-aluminide layer.

6. (Original) The method as defined in claim 3, which includes the step of forming a Re film on said inner layer of the Re-Cr based σ (sigma) phase, wherein the step of subjecting the heat-treated member to an aluminum or silicon diffusion coating includes subjecting said member with said Re film to a silicon diffusion coating to allow said Re film to be formed as a Re-silicide layer.

7. (Previously presented) A method for producing a metal-based resistance heat-generation element excellent in heat resistance and high-temperature corrosion resistance, comprising the steps of:

forming a material made of a platinum-group metal or refractory metal into a shape of a heat-generation element member;

coating on all surfaces of said heat-generation element member with a film made of a Re-Cr alloy or a bilayer film consisting of a Re layer and a Cr layer, thereby obtaining a film-coated member;

heat treating said film-coated member to diffuse Re and Cr into said member so as to convert said member into a platinum-group or refractory metal-Re-Cr alloy, thereby obtaining an alloyed layer; and

subjecting said alloyed layer to an aluminum or silicon diffusion coating so as to form an aluminide or silicide layer on said alloyed layer.

8. (Original) The method as defined in claim 7, which includes the step of forming a Cr film and an Al film on said platinum-group or refractory metal-Re-Cr alloy, wherein the step of subjecting the alloyed member to an aluminum or silicon diffusion coating includes subjecting said alloyed member with said Cr and Al films to an aluminum diffusion coating at a given high temperature to allow said Cr and Al films to be formed as a Cr-aluminide layer.

9. (Original) The method as defined in claim 7, which includes the step of forming a Re film on said platinum-group or refractory metal-Re-Cr alloy, wherein the step of subjecting the alloyed member to an aluminum or silicon diffusion coating includes subjecting said alloyed

member with said Re film to a silicon diffusion coating to allow said Re film to be formed as a

Re-silicide layer.